ripe, and not before, offer attractive colors, generally red, so that the seeds contained in them may be swallowed by animals and then serve their normal function.

To understand the coloring of flowers, one must remember that the object is to have the pollen carried from the anther of one flower to the stigma of another, and thus to secure cross-fertilization. The well-known experiments of Darwin showed that self-fertilized flowers bear fewer and smaller seeds, and when these seeds are planted they develop into smaller, weaker plants, than those resulting from cross-fertilization. Dr. Wallace then described the familiar methods by which cross-fertilization is effected and self-fertilization avoided. The anther and the stigma ripening at different times, the mysterious self-sterility of some pollen, the bending-down of the stigma away from the anthers, and the separation of the stamens and pistils in two distinct flowers, are among the simple modes of avoiding self-fertilization. The more complex ways, such as varying the length of pistil and stamens in different flowers so that pollen from a short stamen will reach a long pistil, and *vice versa;* the innumerable kinds of springs and triggers and traps to retain insects and sprinkle their heads and backs with pollen, — all show the extreme harmony between the vegetable and the animal world. And if a still clearer demonstration of this is needed, we have it in the extreme specialization of some plants to particular insects. Such facts abound; and in the case of an alpine species the same flower, when growing in low regions, where bees abound, is adapted to them, and in high regions is adapted to the visits of butterflies.

Dr. Wallace then gave a brief explanation of the existence of self-fertilized plants. The object is not cross-fertilization, but a slight change in conditions. If the external conditions are rough and varied, self-fertilization is sufficient; but when the environment becomes equable and monotonous, then deterioration results, new blood is necessary, and the devices for cross-fertilization are evolved, and some may imagine that in the course of geological time, changes from the one to the other have gone on according as the desired variations could be best obtained. For example, if a self-fertilizing flower is tending to die out, it may adopt cross-fertilization; if the insects that visit it die out, it may return to self-fertilization.

In conclusion, Dr. Wallace expressed the view that insects had no aesthetic pleasure in color at all, but that this faculty was reserved for man alone, and served as a mark of his distinction.

Dr. Wallace also delivered a lecture on the 'Origin and characteristics of island life' before the students of Johns Hopkins university. The lectures were delivered in a clear and easy manner, and possessed that indefinable attractiveness which comes from many years of original research. It was a high privilege to listen to the words of one who had independently thought out the theory that bears Darwin's name, and has been intimate for years with Darwin himself.

## *NOTES AND NEWS.*

THE December number of the *Political science quarterly* seems to us the strongest that we have yet seen. Economics are represented by Horace White's article on 'The future of banking' and Herbert L. Osgood's 'Scientific socialism;' law, by Professor Burgess's dissertation on von Holst's account of the public law of the United States — published in the *Handbuch des oeffentlichen rechts der gegenwart, in monographien*, under the editorial direction of Professor Marquardsen of Erlangen — and by Professor Goodnow's article on 'The executive and the courts;' history, by the conclusion of John E. Bowen's valuable sketch of the 'Conflict in Egypt;' while Prof. George B. Newcomb's article on 'Theories of property' is partly historical, partly legal, and partly economic. The most popular article is undoubtedly Mr. Osgood's 'Scientific socialism,' which is a pleasantly written account of the life and economic teachings of Rodbertus. Professor Goodnow's article is a valuable and scholarly essay in the field of administrative law, and Professor Burgess's able criticism of von Holst takes rank as the most valuable article of the number. We would call particular attention to the book-reviews, which seem to us, in point of discrimination, treatment, and literary style, the models of what attractive and valuable book-reviews should be. There is no space wasted on valueless works or such as contribute nothing new in the way of thought or presentation to political science, no twisting and turning of isolated passages, and no attempt to write essays on the subjects of which the books selected for notice treat. The reviews are real reviews, straightforward scientific judgments well expressed. We would select as particularly good the notice of recent books on the railway problem by Dr. Seligman, that of Clark's 'Philosophy of wealth' by Prof. Henry C. Adams, and that of Ely's 'Labor movement in America' by Prof. Henry W. Farnam.

— Prof. Thorold Rogers has not finished investigating the early economic history of England. He has in preparation a work on the early history of the Bank of England, which will present much interesting information drawn from original sources.

— The value of American scholarship is now very generally and generously recognized abroad. The latest instance of this recognition, and a very important one, is the association of Professors Briggs and Brown of the Union theological seminary, New York City, with Canon Driver of Oxford in the editorship of a new critical Hebrew lexicon which is being prepared by the delegates of the Clarendon press.

— The article 'United States' in the new edition of the 'Encyclopaedia Britannica' will be written by Prof. J. D. Whitney.

— The fourth annual convention of the modern language association of America will be held at the Johns Hopkins university, Baltimore, on Dec. 28, 29, and 30. On the evening of the 28th an address of welcome will be given by Pres. D. C. Gilman of the Johns Hopkins university, after which will follow an address by the president of the association, Franklin Carter, president of Williams college. On the 29th the usual two sessions will take place, and in the evening a social entertainment will be tendered the convention; on the 30th, session and excursion to Washington. Papers have been reported by several of the leading modern language professors both north and south. Reduced fares on several railways have been obtained, and orders for tickets are already in the hands of the secretary, Prof. A. M. Elliott, Johns Hopkins university, Baltimore, for distribution to all those who may wish to avail themselves of these lowered rates.

## LETTERS TO THE EDITOR.

***Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

### Electrical phenomena on a mountain.

I SEND you a brief account of some electric phenomena experienced by me last summer on Lone Mountain, a peak of the Gallatin range about thirty miles south-west of Bozeman, Montana.

In company with Mr. James Walsh, my assistant, I climbed this mountain on Aug. 7, 1886, for the purpose of making it a topographic station of my work in that vicinity. It is about eleven thousand feet above sea-level, and higher than any other peak within a radius of at least twenty miles. It stands alone, being separated from the other high points of the range by low saddles The mornings for two weeks previous had been bright and clear, but afternoon thunderstorms were of daily occurrence. The morning of Aug. 7 was clear as usual; but about noon clouds had appeared in the west, and by 2 P.M. distant rumbles of thunder were heard, and dense black cloud-masses were sweeping towards us. About this time, as I was working at my plane-table, I heard a peculiar buzzing sound coming from the instrument, very much as if a large fly or wasp was imprisoned beneath one of the plane table sheets. Placing my hand on the table, I received quite a severe shock, and, starting back in surprise, felt another in my partly uplifted right arm. Immediately after the rocks about us began to hum and buzz in a peculiar manner, giving a sort of musical sound, and the hair of our heads, beards, and eyelashes to snap and crackle viciously. This phenomenon was felt with greater intensity in a small spot on the very tops of our heads, was accompanied by a tingling sensation, and at short intervals by slight shocks, which made us cringe involuntarily. On removing our hats, a tuft of hair stood upright over these spots. A shock was received whenever the hand came in contact with the head.

Placing the instruments in a horizontal position under cover, we descended the mountain about one hundred yards to a point perhaps fifty feet below the summit, and lay down flat. While in this situation, no unpleasant feelings were experienced, although the rocks still continued their musical hum; but the shocks and tingling sensations were immediately felt on raising any portion of our bodies to an upright position. The thunder-storm, accompanied by hail and rain, soon burst upon us, and continued for half an hour, after which the peculiar electric condition of the atmosphere passed away.

We noticed during the storm that at least eighty per cent of the lightning flashes passed between masses of clouds, and not between the clouds and earth, and that none of these flashes, as determined by the interval between sight and sound, were within a mile and a half of the peak we were on.

The summit of Lone Mountain is a loose mass of broken volcanic rock. There are no large bowlders or projecting points of any kind. M. F.

Washington, Nov. 24.

### Archeological enigmas.

Professor Mason's article under the above heading in the last number of *Science* (viii p. 528) contains a report of remarks by myself which is in some respects inaccurate, and it appears to me that the subject is of sufficient importance to command the space necessary for a correction. The formation in which the hearth was found is a shore-deposit of a lake held in the Ontario basin during the final retreat of the ice-sheet. The ice-front then extended as far south as the Adirondack Mountains, and this prevented the water from escaping by the St. Lawrence valley. The local relations indicate that the hearth was made during the accumulation of the shore-deposits, so that its antiquity is somewhat less than that of the culmination of the last general glaciation of north-eastern America. Its antiquity is also sensibly identical with that of the Niagara River; so that, whenever a satisfactory estimate has been made of the time consumed in the cutting of the Niagara gorge, the age of the hearth will have been determined in years. The estimate of seven thousand years is based upon the hypothesis that the rate of recession of the falls has been uniform throughout the period of the excavation of the gorge, — an hypothesis not yet sufficiently examined.

The phrases 'Mr. Gilbert's find' and 'the Gilbert hearth' are misleading. The hearth was discovered by Mr. Daniel Tomlinson of Gaines, N.Y., and our knowledge of it is based entirely upon his oral evidence. It was first communicated to the scientific